

Lifting Device for Diverter Switch Inserts

Operating Instructions BA 166/02





NOTE!

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1 Safety


1.1 Safety labels


The following safety labels relating to the operation of the Lifting Device for Diverter Switch Inserts are used in these Operating Instructions.


These labels must be observed at all times

	DANGER!
	Refers to an imminent danger that may result in death or severe injury if not avoided.

	WARNING!
	Refers to a potentially dangerous situation that may result in death or severe injury if not avoided.

	CAUTION!
	Refers to a potentially dangerous situation that may result in slight injury or material damage if not avoided.

	ATTENTION!
	Refers to a potentially harmful situation that may result in damage of the product itself or of adjacent objects if not avoided.

	NOTE!
	Contains important information and special notes.

1.2 Safety instructions

- **All warnings and safety instructions must be observed at all times!**

Failure to follow the safety instructions may lead to accidents and severe personal injury for you and your colleagues.

- **Please read these operating instructions before commissioning the equipment!**

Please read the Operating Instructions before switching on the Lifting Device for Diverter Switch Inserts. As the operator, you are responsible for ensuring that users of the equipment have fully understood the operating and safety instructions.

- **Train your staff!**

Before asking staff to work with the Lifting Device for Diverter Switch Inserts, provide training regarding general and special safety instructions and accident prevention regulations.

- **Only suitably qualified personnel should work with the Lifting Device for Diverter Switch Inserts!**

The Lifting Device for Diverter Switch Inserts is designed exclusively for application in electrical or energy systems and facilities operated by appropriately trained staff, i.e. staff who are familiar with the installation, assembly, commissioning and operation of such products.

2 Function


2.1 Intended Use

The device is a lifting device. It is used to pull out or to install the diverter switch insert. The lifting and lowering is done by pulling the hand chain on the pulley.


The maximum permissible lifting capacity is 150 kg with trolley completely extended.

The lifting device is used exclusively to pull out and install the diverter switch insert of on-load tap-changers.


The lifting device is to be used for the on-load tap-changers listed in these operating instructions.

	WARNING!
	<p>Use the lifting device exclusively to pull out and to insert the diverter switch insert. All technical safety measures are designed for this particular application. Transportation of people or stopping in hazardous zones are prohibited. Changes to the lifting device, attachment of additional devices and the use of mounting devices not supplied by MR are only allowed with our explicit written permission. Arbitrary and inappropriate work during setup, dismantling, commissioning and operation are prohibited for safety reasons!</p>

The lifting device is not certified for continuous operation.

	WARNING!
	<p>Never use the lifting device as ground during welding work.</p>

The device is not suitable for use in potentially explosive areas. The lifting device and the mounting methods may not come in contact with free hydrogen, acids or corrosive cleaning agents.

	NOTE!
	<p>When using the lifting device be sure to adhere to the regulations applicable to the country in which the device is being used.</p>

In Germany, there are currently:

- 9.GSGV machine directive
EG guideline 98/37/EG machine guideline
- DIN EN 292, part 1 / 11.91:
Safety of machines
Basic terms, general design principles
Part 1: Basic terminology, methods
- DIN EN 292, part 2 / 06.95:
Safety of machines
Basic terms, general design principles
Part 2: Technical principles and specifications
- UW VBG 8
Winching, lifting and pulling devices
- UW VBG 9a
Load bearing devices for hoisting operation



3 Technical Data

3.1 Lifting Device for Mounting on the Transformer Tank

Part number	095189:	095190:	095191:	095192:	095193:
Required for on-load tap-changer type	M D	T	E V, VR MΔ, R	DΔ	C250 C350 H, VV
Lifting capacity [kg]	150	150	150	150	150
Extension height X [mm]	1500	1 750	2000	2250	2500
Required column pipe extension [mm]	-	250	500	250+500	1000
Setup height Y [mm]	2047	2297	2547	2797	3047
Total weight [kg]	77.8	83.2	86.8	92.5	92.2

Table 1 Lifting device for mounting on the transformer tank

The maximum permissible setup height of the lifting device is 3547 mm.

3.2 Lifting Device for Mounting on the On-Load Tap-Changer Head

Part number	095185:	095186:	095187:	095188:	095200:	095476:	095477:	095861:	095862:	095863:
Required for on-load tap-changer type	M	T	MΔ VR R, RM	H VV	V	C250	C350	D GTW- head	D alum. head	DΔ alum. head
Lifting capacity [kg]	150	150	150	150	150	150	150	150	150	150
Extension height X [mm]	1546	1796	2046	2546	2046	2546	2547	1546	1546	2296
Required column pipe extension [mm]	-	250	500	1000	500	1000	1000	-	-	250+500
Setup height Y [mm]	2092	2342	2592	3092	2592	3092	3092	2092	2092	2842
Total weight [kg]	84.2	89.6	93.2	98.2	88.6	95.2	94.8	79.6	79.6	94.0

Table 2 Lifting device for mounting on the on-load tap-changer head

The maximum permissible setup height of the lifting device is 3592 mm.

3.3 Weights of the Individual Components

Designation	Item number	Part number	Weight [kg]
Support plate (mounting on transformer cover)	[1]	092417:	7.8
Base plate (mounting on on-load tap-changer type VV, VR, H, M, R, T)	[1]	094615:	14.2
Base plate (mounting on on-load tap-changer type V)	[1]	094637:	9.6
Base plate (mounting on on-load tap-changer type C250)	[1]	095435:	10.8
Base plate (mounting on on-load tap-changer type C350)	[1]	095459:	10.4
Base plate (mounting on on-load tap-changer type D)	[1]	095823:	9.6
Lower column pipe	[2]	092477:	15.2
Upper column pipe	[5]	092478:	13.2
Extension arm	[12]	708362:	16.0
Additional column	[7]	092998:	6.5
Trolley	[13]	401477:	7.0
Pulley	[15]	712034:	11.0
Column pipe extension 250 mm	[10]	072701:	5.4
Column pipe extension 500 mm	[10]	091929:	9.0
Column pipe extension 1000 mm	[10]	091928:	14.4

Table 3 Weights of the individual components

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4 Setup

The lifting device is distinguished by its uniform construction for all models and its modular extension heights and methods of mounting.

In addition to the take-apart column construction with extension arm, the lifting device includes a trolley and a pulley.


Please adhere to the dimensional drawings 898853 and 898854 in chapter 7.2 and chapter 7.3. The drawings of the lifting devices shown there apply to the on-load tap-changer type T. Different lifting devices and methods of mounting exist for the other on-load tap-changer types.

	NOTE!
	The numbers specified in square brackets are the item numbers in the dimensional drawings 898853 and 898854 in chapter 7.2 und chapter 7.3.

4.1 Mounting

There are two ways to secure the lifting device.

- The lifting device can be directly secured with the support plate to the transformer tank with stud bolts which are welded on.
- The lifting device can be secured with a base plate directly to the on-load tap-changer head.

	ATTENTION!
	Use suitable measures to ensure that no water, dust or foreign bodies can penetrate the open diverter switch oil compartment. Otherwise function failures can occur during operation of the on-load tap-changer. When a base plate is secured to the on-load tap-changer head, the diverter switch oil compartment cannot be closed with the on-load tap-changer head cover.

The lifting device is secured to the transformer tank with the support plate [1]. The support plate is secured with three stud bolts [18] which are welded to the transformer tank (welding electrode, for example: X2CrNiMo28155).

The maximum distance R_{max} (see dimensional drawing 898853) between the middle of the support plate and the middle of the on-load tap-changer may not be exceeded for the particular on-load tap-changer type.

Only when the diverter switch insert is being lowered or hoisted can the R_{max} be exceeded. In this case the load may be extended up to the end of the extension arm.

The values for R_{max} are specified in table 4.

On-load tap-changer type	R_{max} [mm]
V	1150
VV, H, M	1000
MD	900
C250, D	800
DD, T, R, VR	700
C350, E	600

Table 4 Maximum distance R_{max}

4.1.1 Base Plate

The base plate [1] is used to mount the lifting device onto the on-load tap-changer head. The different on-load tap-changer types require different base plates. The base plate is screwed directly to the on-load tap-changer head.

4.2 Lower Column Pipe

The lower column pipe [2] is mounted on the support plate or the base plate. The connection is secured with the safety bolt [3] and a foldable cotter pin [4].

4.3 Additional Column

The additional column [7] is attached to the side pocket of the lower column pipe and secured with the safety bolt [8] and a foldable cotter pin [4].

4.4 Guy Wire with Snap Hook

The guy wire [9] is used to place the upper column pipe in an upright position during mounting.

4.5 Upper Column Pipe

The upper column pipe [5] is connected with the lower column pipe at the joint with the hinge bolt [6] and secured with a foldable cotter pin [4].

4.6 Column Pipe Extensions

The different on-load tap-changer types have diverter switch inserts of varying lengths.

Depending on the required extension height, different column pipe extensions [10] (250 mm, 500 mm und 1000 mm) can be delivered. The column pipe extensions are installed between extension arm and upper column pipe and secured with a safety bolt [11] and a foldable cotter pin [4].

4.7 Extension Arm

The extension arm [12] is slipped over the column pipe and secured with a safety bolt [11] and a foldable cotter pin [4].


4.8 Trolley

Be absolutely sure to read and adhere to the operating instructions included with the trolley.

The trolley [13] runs along the extension arm and is secured by an end stop [14].

This can be locked into various positions with a lock on the trolley.

4.9 Pulley

	ATTENTION!
	<p>Danger of injury! Be absolutely sure to read and adhere to the operating instructions included with the trolley. Incorrect operation can cause serious injury.</p>


The pulley [15] may only be attached to the bracket of the trolley indicated by the label.

4.10 Locking Bar

The locking bar [17] is used for adjustment and release of the trolley.

5 Mounting and Commissioning

5.1 Mounting the Support Plate or Base Plate

	ATTENTION!
	<p>Damage to the lifting device! Before using the lifting device, make sure that the bottom bearing of the lifting device is securely fastened to the provided bearing. Make sure that the lifting device is mounted vertically.</p>

5.1.1 Mounting the Support Plate

Screw the support plate [1] to the transformer cover (tightening torque: 80 Nm). When the transformer cover is slanted, the support plate must be aligned horizontally with disks 073933 and 073934.


The distance R_{max} between the middle of the lifting device and the middle of the diverter switch insert may not be exceeded for the particular on-load tap-changer type. See chapter 4.1.1.

5.1.2 Mounting the Base Plate

Screw the base plate [1] to the on-load tap-changer head (tightening torque: 20 Nm).

The different on-load tap-changer types require different base plates. Make sure that you use the base plate which is designed for your on-load tap-changer type.

5.2 Mounting the Lifting Device

	ATTENTION!
	<p>Danger of injury! Damage to the diverter switch and lifting device! Do not use anything but the pulley to lift the lifting device into an upright position during mounting and demounting. Do not lock the trolley while the lifting device is being lifted into an upright position since otherwise the device might become detached and cause serious injury and property damage. While the device is being lifted into an upright position, it is important that the trolley be in the end position on the column pipe (see dimensional drawings in chapter 7.2 and chapter 7.3).</p>

Slip the lower column pipe [2] over the bottom bearing and secure with a safety bolt [3] and a foldable cotter pin [4].

Connect the upper column pipe [5] and the lower column pipe at the joint with the hinge bolt [6]. Secure with a foldable cotter pin [4].

Insert the additional column [7] in the side holders of the lower column pipe and secure with the safety bolt [8] and a foldable cotter pin [4].

Place the upper column pipe [5] in an upright position and catch with the guy wire [9].

Insert column pipe extensions [10] (250 mm, 500 mm and 1000 mm) in the upper column pipe [5] based on the required extension height and secure with safety bolt [11] and foldable cotter pin [4].

Attach the extension arm [12] and secure with safety bolt column [11] and foldable cotter pin [4].

Hook in the trolley [13] and mount screws [14] for the end stop.

Hang the pulley [15] between trolley [13] and additional column [7] and pull device into an upright position with the pulley.

Close hinge with screws [16].

To remove, proceed in reverse order.


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5.3 Commissioning

Check to determine whether all mounted parts are correctly and well secured.

Check the state of the lifting device. As soon as damage or unusual wear is determined, the affected parts must be replaced immediately..

	ATTENTION!
	<p>Before beginning operation, check to determine whether the load is correctly positioned and secured.</p> <p>The pulley may only be hooked into the hooks provided on the trolley.</p> <p>When wear or damage is obvious, do not use the lifting device.</p> <p>Use only pulleys for lifting which are supplied or approved by the manufacturer.</p>

When additional weight lifting devices are used, make sure that the carrying capacity is sufficient.

Check the brakes of the pulley each time you begin using the device.

6 Operation and Maintenance


6.1 Operation

Before lifting, make sure that the load cannot tip over. Keep in mind the center of gravity of the load to be moved.

During operation, make sure that loads are always moved at a sufficient distance from other objects so that no accidental hindrance of movement can occur.

Avoid oscillations of the load, the trolley or the lifting device. Never leave the load hanging in the air unattended.

After a dangerous situation or after complications (abnormal noise, abnormal operation) immediately inform the persons responsible.

	ATTENTION!
	<p>The lifting device is only certified for vertical operation. Never transport loads in the immediate vicinity of people. Never move the load hook (neither with or without a load) over people. Transporting people with the help of the lifting device is not permitted. The lifting device may not be used as a fixation point for securing people.</p>


The lifting device may only be used for pulling out and installing the diverter switch insert.

Never use the lifting device to pull out or release wedged-in parts or to pull sideways.

Make sure that the pulley and the trolley are only used as intended. You will find information on this subject in chapter 4.8 and chapter 4.9 of these operating instructions.

The chain of the pulley is only designed for lifting and lowering diverse loads and may not be used for any other purposes. The chain may not be pulled over sharp edges or be twisted. Do not lengthen the chain.

6.2 Maintenance

	CAUTION!
	<p>The complete lifting device must be relieved of all loads with suitable measures prior to all inspection and maintenance work!</p>

The lifespan of the device is limited to 25 years when used as intended (exception: parts subject to wear and tear).

Inspection intervals	Maintenance/inspection work
Before every use	Visual check Check function of the device
Annually	Check all parts for wear and replace defective parts as necessary. Have check done by a technical expert

Table 5 Maintenance/inspection work to be performed

Use only original spare parts for all maintenance work. Maschinenfabrik Reinhausen GmbH will accept no liability for spare parts or accessories of other companies.

6.3 Transportation and Storage

Only transport the lifting device on the lifting points provided or in its original packaging.

Do not store the lifting device in corrosive environments (dust, moisture, etc.). Protect all parts against corrosion



7 Appendix

7.1 EU Declaration of Conformity

MR REINHAUSEN
GERMANY

EU Declaration of conformity
No. MRCELIFT-1E

Manufacturer: MASCHINENFABRIK REINHAUSEN GMBH

Address: Falkensteinstrasse 8
93059 Regensburg
Federal Republic of Germany

Name of the product: **Lifting device for diverter switch unit**

Serial No.:

The above mentioned product complies with the provisions of the following European directive:

98/37/EG Directive of the European Parliament and of the Council on 22th June, 1998,
on bringing into line the legal and administrative provisions of the member
countries regarding machines

The conformity of the stated product with the provisions of this directive is demonstrated by compliance with the following standard:

EN 292-1 : 1991

EN 292-2 : 1995

Fixing of CE marking: 1999

This declaration certifies compliance with said directive, but is not a guarantee within the meaning of product liability law.

The safety instructions in the product documentation included are to be observed.

Regensburg, 07.12.1999

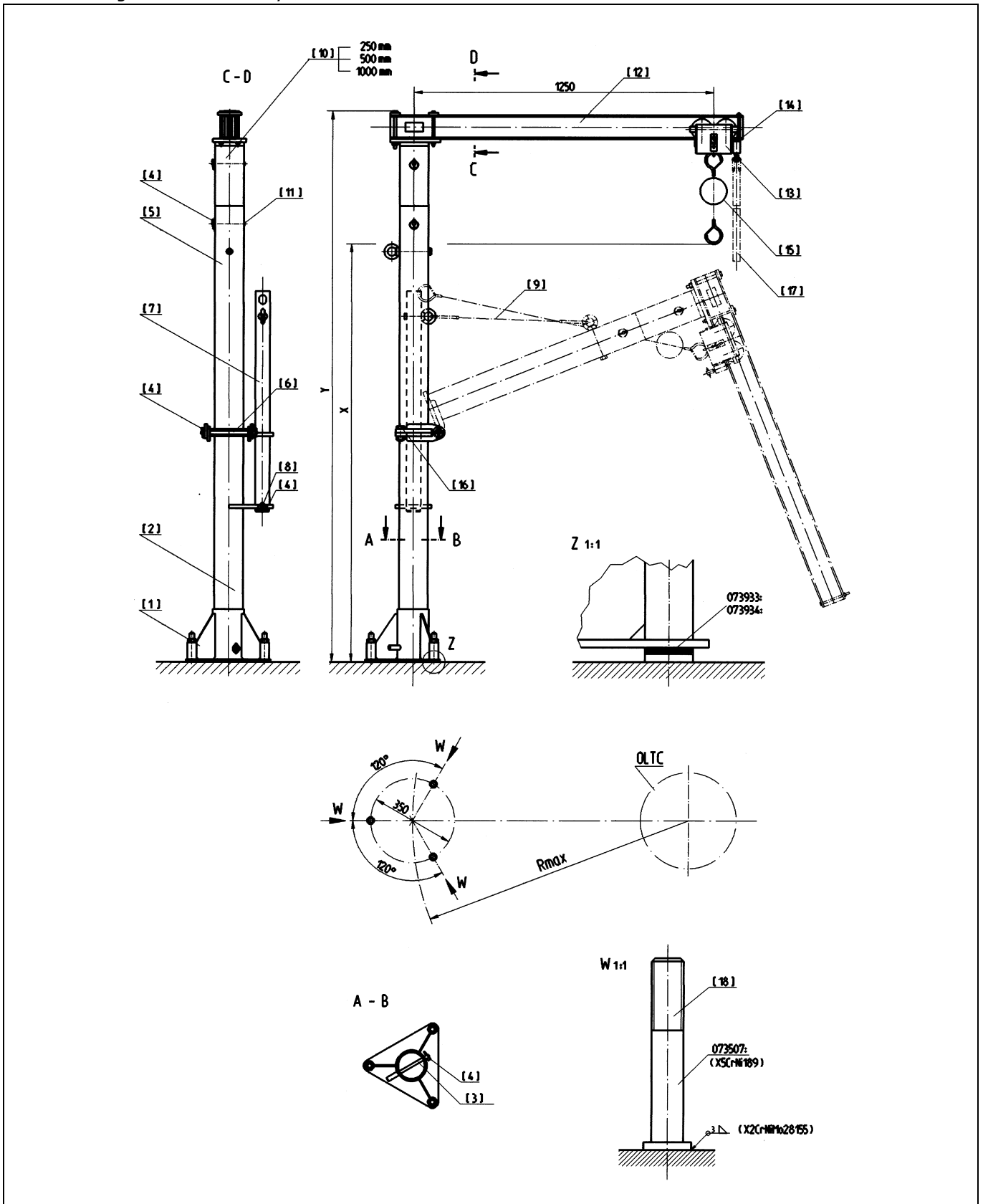
MASCHINENFABRIK REINHAUSEN GMBH

Mr. Roland K. Fricke

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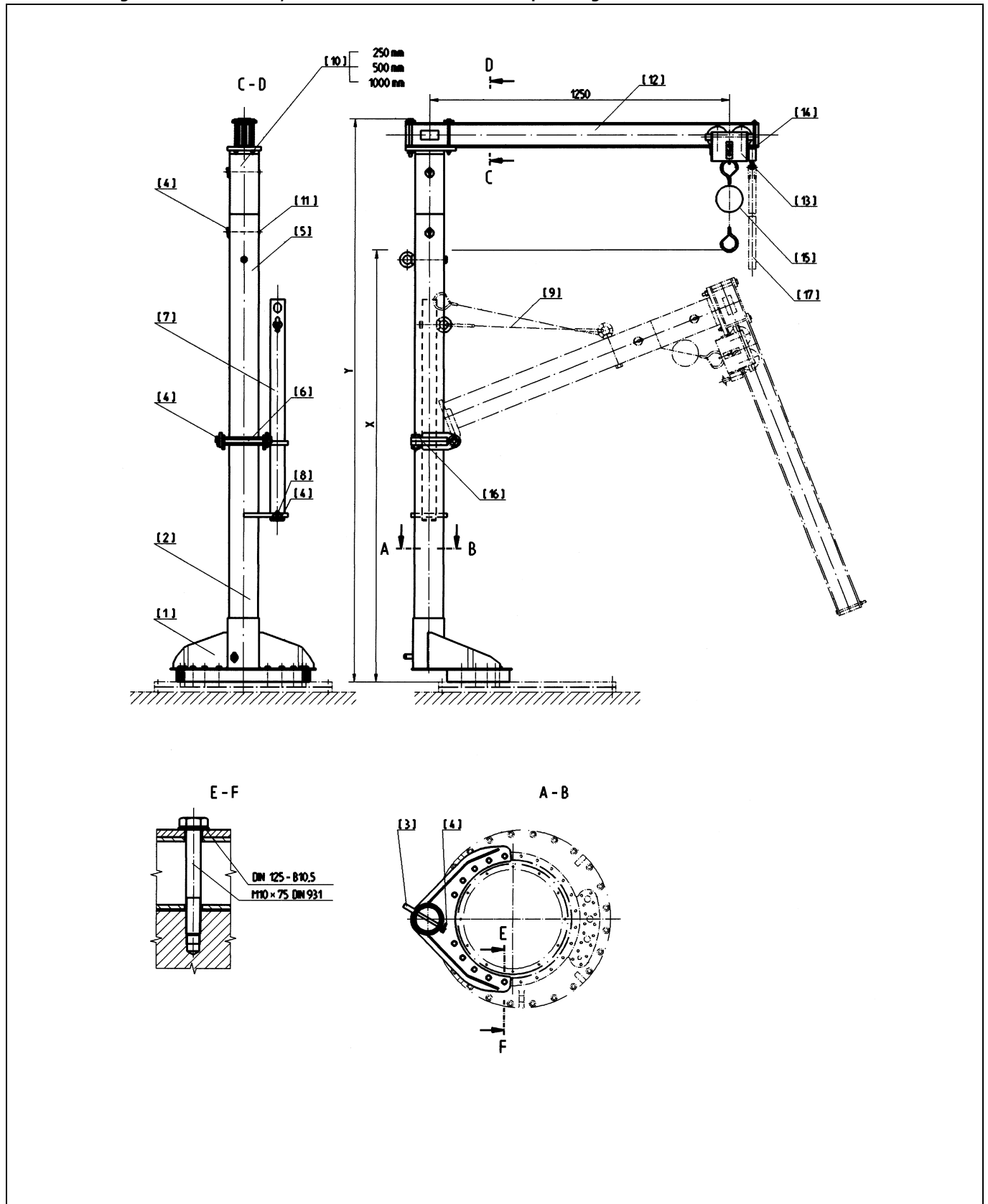
7.2 Lifting Device with Trolley (Mounted on the Transformer Cover: 8988530E)



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7.3 Lifting Device with Trolley (Mounted on the On-Load Tap-Changer Head: 8988540E)



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